Remarks

The Office Action mailed August 28, 2006 has been carefully reviewed and the following remarks have been made in consequence thereof.

Claims 1-6 are now pending in this application. Claims 1-6 are rejected. Claims 2 and 5 have been amended. No new matter has been added.

The rejection of Claims 1, 5, and 6 under 35 U.S.C. § 102(e) as being anticipated by Mori (U.S. Patent No. 6.526.305) is respectfully traversed.

Mori describes a method of fiber reconstruction. In the method, a fiber structure is propagated or connected in a three-dimensional (3D) form from a data point of interest if adjacent pixels have anisotropy higher than a threshold value and an inner product between the pixels is higher than another threshold value (column 5, lines 59-63). A data point inside an optic tract of fixed sheep brain is propagated if an adjacent data point has an anisotropy index of higher than 0.38 and an inner product higher than 0.98 (column 5, lines 63-67).

Claim 1 recites a fiber rendering apparatus comprising "a device for specifying a region of interest or volumetric region of interest in three-dimensional image data collected by a diffusion tensor method in an MRI apparatus; a device for defining regular grid points in the region of interest or volumetric region of interest; a device for defining points obtained by randomly moving the grid points in a two-dimensional or three-dimensional manner as tracking start points; a device for performing diffusion tensor analysis on each tracking start point in the three-dimensional image data to determine a direction of a principal axis vector; a device for tracking a fiber by repeatedly selecting a neighbor point along the direction of the principal axis vector and performing diffusion tensor analysis on the neighbor point to determine a direction of a principal axis vector; and a device for producing and displaying an image of the tracked fibers as viewed in a desired view direction."

Mori does not describe or suggest a fiber rendering apparatus as recited in Claim 1. Specifically, Mori does not describe or suggest a device for defining points obtained by randomly moving the grid points in a two-dimensional or three-dimensional manner as tracking start points, a device for performing diffusion tensor

analysis on each tracking start point in the three-dimensional image data to determine a direction of a principal axis vector, a device for tracking a fiber by repeatedly selecting a neighbor point along the direction of the principal axis vector and performing diffusion tensor analysis on the neighbor point to determine a direction of a principal axis vector, and a device for producing and displaying an image of the tracked fibers as viewed in a desired view direction. Rather, Mori describes a device that propagates a data point inside an optic tract of a brain if an adjacent data point has an anisotropy index of higher than 0.38 and an inner product between the data point and the adjacent data point is higher than 0.98. A description of the device that propagates the data point based upon the anisotropy index does not teach a device for defining points obtained by randomly moving the grid points in a two-dimensional or three-dimensional manner as tracking start points. Accordingly, Mori does not describe or suggest a device for defining points obtained by randomly moving the grid points in a two-dimensional or three-dimensional manner as tracking start points and the remaining recitations of Claim 1 that use the tracking start points. For the reasons set forth above, Claim 1 is submitted to be patentable over Mori.

Claim 5 recites a fiber rendering apparatus comprising "a device for defining tracking start points in three-dimensional image data collected by a diffusion tensor method in an MRI apparatus, wherein the tracking start points are generated by displacing a plurality of grid points located in a region of interest; a device for performing diffusion tensor analysis on each tracking start point in the three-dimensional image data to determine a direction of a principal axis vector and eigenvalues of a diffusion tensor; a device for tracking a fiber by repeatedly selecting a neighbor point along the direction of the principal axis vector and performing diffusion tensor analysis on the neighbor point to determine a direction of a principal axis vector and eigenvalues of a diffusion tensor; and a device for producing an image of the tracked fibers as viewed in a desired view direction and displaying the image with display colors reflecting the eigenvalues of the diffusion tensors at the tracking start points and neighbor points."

Mori does not describe or suggest a fiber rendering apparatus as recited in Claim 5. Specifically, Mori does not describe or suggest a device for defining tracking start points in three-dimensional image data collected by a diffusion tensor

method in an MRI apparatus, where the tracking start points are generated by displacing a plurality of grid points located in a region of interest, a device for performing diffusion tensor analysis on each tracking start point in the three-dimensional image data to determine a direction of a principal axis vector and eigenvalues of a diffusion tensor, a device for tracking a fiber by repeatedly selecting a neighbor point along the direction of the principal axis vector and performing diffusion tensor analysis on the neighbor point to determine a direction of a principal axis vector and eigenvalues of a diffusion tensor, and a device for producing an image of the tracked fibers as viewed in a desired view direction and displaying the image with display colors reflecting the eigenvalues of the diffusion tensors at the tracking start points and neighbor points. Rather, Mori describes a device that propagates a data point inside an optic tract of a brain if an adjacent data point has an anisotropy index of higher than 0.38 and an inner product between the data point and the adjacent data point is higher than 0.98. A description of the device that propagates the data point based upon the anisotropy index does not teach the tracking start points that are generated by displacing a plurality of grid points located in a region of interest. Accordingly, Mori does not describe or suggest the tracking start points are generated by displacing a plurality of grid points located in a region of interest and the remaining recitations of Claim 5 that use the tracking start points. For the reasons set forth above, Claim 5 is submitted to be patentable over Mori.

Claim 6 depends from independent Claim 5. When the recitations of Claim 6 are considered in combination with the recitations of Claim 5, Applicants submit that dependent Claim 6 likewise is patentable over Mori.

For at least the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 1, 5, and 6 be withdrawn.

The rejection of Claims 2-4 under 35 U.S.C. § 103(a) as being unpatentable over Mori in view of Laidlaw et al. (U.S. Patent Application Publication No. 20030234781) is respectfully traversed.

Mori is described above. Laidlaw et al. describe a direct-volume-rendering technique that makes connectivity apparent by using a coloring and lighting approach. The color and lighting approach is based on a diffusion magnitude and a diffusion

anisotropy (paragraph 35). In addition, the technique expands the use of an opacity map to generate color, in addition to opacity (paragraph 35).

Claim 2 recites a fiber rendering apparatus comprising "a device for defining tracking start points in three-dimensional image data collected by a diffusion tensor method in an MRI apparatus, wherein the tracking start points are generated by displacing a plurality of grid points located in a region of interest; a device for performing diffusion tensor analysis on each tracking start point in the three-dimensional image data to determine a direction of a principal axis vector and a diffusion anisotropy value; a device for tracking a fiber by repeatedly selecting a neighbor point along the direction of the principal axis vector and performing diffusion tensor analysis on the neighbor point to determine a direction of a principal axis vector and a diffusion anisotropy value; and a device for producing an image of the tracked fibers as viewed in a desired view direction and displaying the image with opacity reflecting the diffusion anisotropy values at the tracking start points and neighbor points."

Neither Mori nor Laidlaw et al., considered alone or in combination, describe or suggest a fiber rendering apparatus as recited in Claim 2. Specifically, neither Sharaf et al. nor Okutomi et al., considered alone or in combination, describe or suggest a device for defining tracking start points in three-dimensional image data collected by a diffusion tensor method in an MRI apparatus, where the tracking start points are generated by displacing a plurality of grid points located in a region of interest, a device for performing diffusion tensor analysis on each tracking start point in the three-dimensional image data to determine a direction of a principal axis vector and a diffusion anisotropy value, a device for tracking a fiber by repeatedly selecting a neighbor point along the direction of the principal axis vector and performing diffusion tensor analysis on the neighbor point to determine a direction of a principal axis vector and a diffusion anisotropy value, and a device for producing an image of the tracked fibers as viewed in a desired view direction and displaying the image with opacity reflecting the diffusion anisotropy values at the tracking start points and neighbor points. Rather, Mori describes a device that propagates a data point inside an optic tract of a brain if an adjacent data point has an anisotropy index of higher than 0.38 and an inner product between the data point and the adjacent data point is

higher than 0.98. Laidlaw et al. describe a coloring and lighting approach that is based on a diffusion magnitude and a diffusion anisotropy. In addition, the technique expands the use of an opacity map to generate color, in addition to opacity. A description, in Mori, of the device that propagates the data point based upon the anisotropy index and a description, in Laidlaw et al., of the coloring and lighting approach does not teach the tracking start points that are generated by displacing a plurality of grid points located in a region of interest. Accordingly, neither Sharaf et al. nor Okutomi et al., considered alone or in combination, describe or suggest the tracking start points are generated by displacing a plurality of grid points located in a region of interest. For the reasons set forth above, Claim 2 is submitted to be patentable over Mori in view of Laidlaw et al.

Claims 3 and 4 depend, directly or indirectly, from independent Claim 2. When the recitations of Claims 3 and 4 are considered in combination with the recitations of Claim 2, Applicants submit that dependent Claims 3 and 4 likewise are patentable over Mori in view of Laidlaw et al.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 2-5 be withdrawn.

Moreover, Applicants respectfully submit that the Section 103 rejection of Claims 2-5 is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Neither Mori nor Laidlaw et al., considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Mori with Laidlaw et al. because there is no motivation to combine the references suggested in the cited art itself.

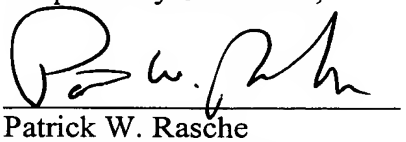
As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both

found in the prior art, and not based on Applicants' disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Mori teaches a device that propagates a data point inside an optic tract of a brain if an adjacent data point has an anisotropy index of higher than 0.38 and an inner product between the data point and the adjacent data point is higher than 0.98. Laidlaw et al. teach a coloring and lighting approach that is based on a diffusion magnitude and a diffusion anisotropy. In addition, the technique expands the use of an opacity map to generate color, in addition to opacity. Since there is neither teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejections of Claims 2-5 be withdrawn.

In view of the foregoing amendment and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,



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